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2	141	Giovannoli	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/09/15 08:54
3	64	Giovannoli and "2000"	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2004/09/15 08:57
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34	1549	705/37.ccls. and (price or cost or fee)	USPAT; US-PGPUB	2004/09/15 13:09
35	160	(705/37.ccls. and (price or cost or fee)) and (reus$ or recycl$ or repair$)	USPAT; US-PGPUB	2004/09/15 13:17
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Holzen, Stephen

From: PLUS
Sent: Tuesday, September 14, 2004 1:29 PM
To: Holzen, Stephen
Subject: PLUS Results for 09956934

Here are the PLUS search results for 09956934.

This search was prepared by the staff of the Scientific and Technical Information Center, SIRA. If you have questions or comments about this search, please reply via email to PLUS@uspto.gov.


09956934_QUAL.txt


09956934_LIST.txt


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09956934_EAST.txt


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09956934_CLS.txt


09956934_CLSTITLES.txt


09956934_WDS.txt

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PATENT ABSTRACTS OF JAPAN

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(43)Date of publication of application : 21.08.1998

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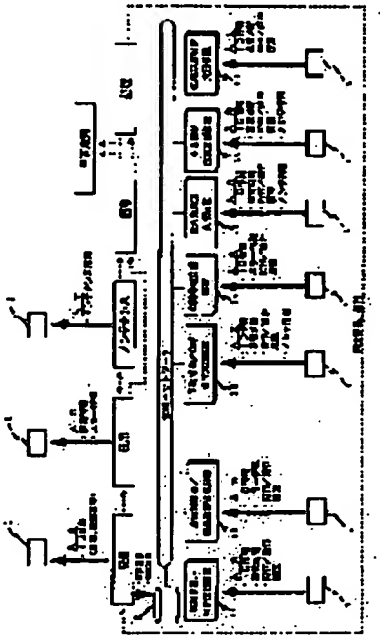
(21)Application number : 09-024737
(22)Date of filing : 07.02.1997

(71)Applicant : HITACHI LTD
(72)Inventor : SUZAKI KIKUO
SHIYOKUSAWA HIROYUKI
ISHIDA TOMOTOSHI

(54) PRODUCT AND PART INDIVIDUAL INFORMATION SERVICE SYSTEM IN PRODUCT LIFE CYCLE

(57)Abstract:
PROBLEM TO BE SOLVED: To attain low costs in a whole life cycle by allowing a product and part itself to have individual management information.
SOLUTION: Information transfer among each processing of manufacture, use, maintenance, collection, and secondhand sales is operated by using information in an individual management storage device 1 provided in a product and data in an outside storage device 2 obtained through an information network. The outside storage device 2 is connected with an information network, connected with supporting devices 11-17 in each processing such as manufacture and maintenance or the like, and the necessary information of the supporting devices is provided. Individual information such as material information or part constitution information is stored with the ID information of the product in a data base at the time of manufacture. Also, product history information such as the activation information and maintenance information of each product is stored in the product itself as individual management information. Then, information necessary for each processing support or the like is processed, judged, and outputted by sharing the data base, and using the individual management information in each step of a product life cycle.



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[Date of request for examination] 19.05.2000
[Date of sending the examiner's decision of rejection]
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]
[Date of final disposal for application]
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[Date of registration]
[Number of appeal against examiner's decision of rejection]
[Date of requesting appeal against examiner's decision of rejection]
[Date of extinction of right]

Components Calculating their own life cycle

Please Scan As Ex. Notes

US006480861B1

(12) **United States Patent**
Kanevsky et al.

(10) **Patent No.: US 6,480,861 B1**
(45) **Date of Patent: Nov. 12, 2002**

(54) **DISTRIBUTED ADAPTIVE COMPUTING**

(75) Inventors: **Paul Kanevsky**, Lawrenceville; **Anthony C. Pizi**, Cranbury; **Thomas Tsao**, Princeton Junction; **Daniel Tyler**, Lambertville, all of NJ (US)

(73) Assignee: **Merrill Lynch, Co., Inc**, New York, NY (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

Date of

(21) Appl. No.: **09/258,711**

(22) Filed: **Feb. 26, 1999**

(51) **Int. Cl.**[7] **G06F 17/30**

(52) **U.S. Cl.** **707/103**; 707/10; 705/80; 705/400; 709/202

(58) **Field of Search** 707/10, 104, 103; 705/70, 79, 80, 10, 34, 35, 400; 709/229, 203, 217, 202

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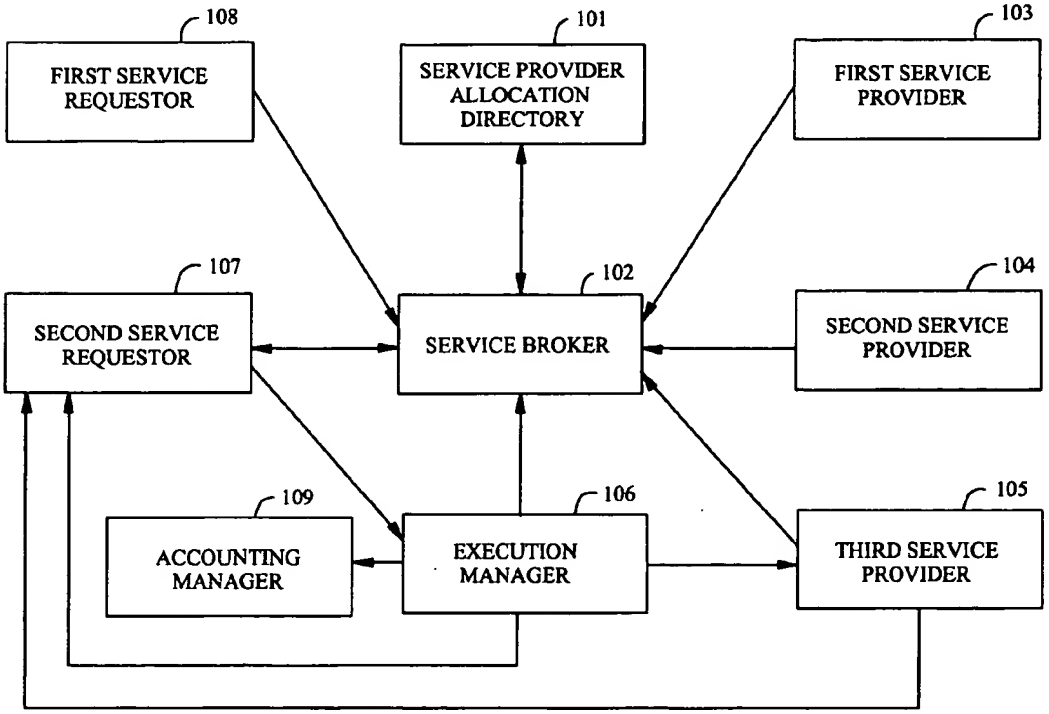
Primary Examiner—Greta L. Robinson
(74) *Attorney, Agent, or Firm*—Morgan, Lewis & Bockius, LLP

(57) **ABSTRACT**

A system and a method for managing, organizing, and allocating service providers in the operational environment of a distributed computer network by applying trade and price mechanisms to a plurality of resource allocation decisions. Local resource allocation rules are set forth for maintaining a near-optimal, global load distribution. The service providers are dynamically allocated based upon the supply of the providers and the demand thereof. An automated mechanism, based on service provider reputation, channels demand away from failing or broken service providers. Strategic load balancing rules cause the elimination of ineffective service providers, and also provide a dynamic replication of service providers that cannot handle the current demand. Further, a method for managing the overall system behavior utilizes administrative surcharges.

31 Claims, 6 Drawing Sheets



1. User input a fee (budget)
2. User input a Requested Service
3. Server filters Service Providers based on fees & requested Services
4. Server informs the providers the fees & services Requested
5. Server recieves requested selling prices from sellers
6. Server selects a provider based on filters
7. Presents fees to user/requestor

service provider, the request is either granted or not granted. Access privileges to system resources are typically defined and assigned by an administrator. The administrator grants these privileges to requesting entities in an effort to anticipate access requirements in advance of actual service requests. While this method of access control is well-suited to the provision of system security, it is deficient when applied to resource allocation. The assignment of privileges to regulate access to resources is essentially an effort to early-bind the set of resources to a service requestor. Such an assignment shares the same set of design deficits as the early binding technique described above.

As a consequence of the limitations of the foregoing resource allocation techniques, it has become common practice to:

(i) Allocate resources to satisfy hypothetical peak demands, thereby guaranteeing that, for those times that the system is not operating at peak demand, a portion of the allocated resources are idle;

(ii) Postpone efforts to improve slow service provider response times. Often, the response times can be decreased by the reallocation of resources. However, because organizations lack the man-hours to actually configure the population of service providers, this work is typically postponed until time permits; and/or

(iii) Dedicate network resources to performing a specific task. This leads to inefficient resources allocation under anything but the expected load conditions. In addition, this causes even more network resources to remain idle under normal load.

Other prior art approaches have dealt with selecting appropriate physical locations for applications on a network so as to enhance system performance. The physical location of an application on a network directly impacts the response time of that application. Services installed on under-utilized resources execute faster than identical services installed on busy resources. The topological proximity of a service to its potential requestors and the proximity of system resources necessary for the delivery of that service directly affect the response time of that service. Ideally, the decision of where an instance of a service ought to be installed takes into account the location of the community of service requestors, available bandwidth, the proximity of data and third party services, and the load on the server where the services run. At present, this decision is typically made by system administrators and is adjusted as new applications, resources and demands are made of the system. Unfortunately, as in the case of resource allocation, decisions pertaining to resource location are also labor-intensive and subject to similar constraints. However, the locations of system resources, service providers, and service points are not readily changeable so as to provide for optimization under a variety of conditions. This is compounded by the difficulty associated with gathering statistics and measures to determine if the location of a service is inefficient and if so, where to relocate the service in order to maximize efficiency.

SUMMARY OF THE INVENTION

In view of the deficiencies of the prior art, it is an object of the invention to provide a dynamic mechanism for managing, organizing, and allocating service providers in the operational environment of a computer network.

It is a further object of the invention to apply market economic methods to the management, organization, and allocation of service providers.

It is a still further object of the invention to apply trade and price mechanisms to a plurality of local resource allocation decisions, and to merge these decisions into resource allocation rules which efficiently manage service provider usage in large computer networks.

It is another object of the invention to dynamically allocate service providers based upon the supply of the providers and the demand thereof.

It is moreover another object of the invention to utilize only locally available information to perform global optimization of service provision.

It is yet another object of the invention to provide a real-time service provider allocation scheme that adaptively responds to ever-changing system conditions.

It is a further object of this invention to permit system administrators to influence the utilization of selected service providers through the use of price surcharges.

In accordance with the objects of the invention, one or more service providers are allocated according to the relative priorities of processes which request the use of a respective service provider. A service provider may refer to a database, a computer program, a person providing services over a computer network, an information resource, or a hardware resource such as a fax machine, a printer, or a data storage drive. A process refers to the manner in which any entity that can request the allocation of a service provider will use that service if it is, indeed, allocated to that entity. A service requestor refers to an entity that may require the use of one or more service providers. Illustrative service requestors include computer programs as well as devices coupled to the computer network for use by individuals requesting services.

A plurality of service providers, a plurality of service requestors, and a service broker are all accessible from a computer network. The service broker uses a service provider allocation directory to allocate service providers to service requestors based upon dynamically-changing pricing constraints.

The service provider allocation directory associates each of a plurality of service providers with a set of representative indicators. A first indicator identifies a type or class description of the service provider. A second indicator specifies the location of the service provider on the computer network. A third indicator specifies the base price from the service provider which includes the cost of underlying services. The service provider allocation directory may also utilize one or more of the following optional indicators. For instance, the service provider may provide one or more attribute prices, which are all entered into the service provider allocation directory as a fourth indicator. The attribute prices specify the price differential for different levels of service or options that the service provider has available. A fifth indicator may specify the load premium as provided by the execution manager. The load premium reflects the demand on a given service provider by the service requestors. Increased demand causes the premium to increase. Decreased demand causes the premium to gradually decrease. A sixth indicator may specify the reputation premium as provided by the execution manager. The reputation premium is used as an adjustment to direct requests away from service providers that have a history of failure or not fulfilling service requests. Each failure to complete a request causes a proportional increase in the reputation premium. A seventh indicator may represent an administrative premium which can be utilized by the system administrator to influence system usage to or away from a service provider.

Service requestors issue service requests over the computer network. The service request includes the type or class

of service desired, as well as a budget specifying the maximum price that the service requestor will pay for that service. Service requests are allotted request budgets which are representative of the relative value the users of the invention place on the timely execution of a service request. Higher request budgets allow the service requestor to purchase higher execution priority from a service provider, thereby providing a more timely execution of the service request. Moreover, the service requestor will allocate a higher percentage of its total budget to individual service requests having higher business value. In this fashion, service requests with high business value, as expressed by their budget, gain prioritized access to the invention's resources.

Service providers send availability messages to the service broker indicating the availability of one or more services. These messages identify the type or class of service, the location of the service, and associate each service with a base price and attribute prices. The broker stores these availability messages in the service provider allocation directory. The execution manager sends execution premium messages to the service broker indicating new, updated values for the reputation and load premiums. The broker stores the execution premiums in the service provider allocation directory.

In response to the receipt of a service request, the service broker uses the indicators in the service provider allocation directory to generate a trial candidate list of service providers. This trial candidate list includes only service providers of the type or class desired by the service requestor. The service broker then calculates a levied price for each of a plurality of service providers on the trial candidate list. The levied price is the summation of the base price, requested attribute price, load premium, reputation premium, administrative premium and a delivery premium that is determined based on the relative locations of the service requestor and the service provider.

The service broker eliminates any service providers on the trial candidate list that do not have a levied price below the budget specified in the service request, thus providing a final candidate list. The service broker then generates a draft contract for each service provider on the final candidate list. The draft contract specifies the identity of the service provider, the location of this service provider on the computer network, the identity of the service requestor, the location of the service requestor on the computer network, the levied price, the base price, the attribute price, the load premium, the reputation premium, the administrative premium, the delivery premium, the type or class of service, an optional schedule for performance of the service, and an optional contract expiration date and time.

In response to the receipt of one or more draft contracts, the service requestor may choose to redeem any of these draft contracts through the use of an execution manager software component accessible from the computer network. However, it is usually the lowest-priced draft contract that is redeemed. The execution manager directs the execution of a service request contract, and instructs the accounting manager to collect the funds from the service requestor to make payments to the service provider. Every service provider and service requestor in the system has an associated account that describes the funds at the service provider or service requestor's disposal. These funds are used as a medium of exchange between service provider and service requestor. Upon the successful delivery of service the accounting manager extracts funds from the service requestor account and moves them to the service provider account in the amount of the sum of the base price, the attribute price and the load premium specified in the redeemed contract. In this manner the account associated with the service provider gains funds.

Service providers are also charged rent. Rent is defined as a periodic charge against a service provider account. The rent is determined by the summation of all levied prices for all software and hardware components needed to actively maintain the service provider, even while it remains idle. In this manner, the rent and therefore the account level, are directly related to the speed, capacity and demands associated with the physical hardware, for example, memory, disk storage, and CPU utilization. In this manner, the account associated with a service provider loses funds.

The invention will install additional copies of a service provider on the network when at least one of the following administratively defined thresholds has been surpassed: (1) the account associated with a service provider which provides a record of the successful delivery of service over time; (2) the reputation premium associated with a service provider which provides a measure of the service providers ability to deliver service; (3) the load premium which is a measure of current demand on a service provider. The invention will split the funds associated with the original service provider account between the original service provider and the newly created copy. When a service provider account shrinks past an administratively defined threshold, due to payment of rent and a lack of demand, the service is deemed bankrupt and the service provider is erased from the service provider allocation directory and removed from the network.

Pursuant to a preferred embodiment of the invention, the levied price charged by each service provider is dynamically adjusted over time in accordance with a set of adjustment rules. According to a first rule, as the demand for a particular service provider increases, its levied price also increases. The levied price of a service provider that is idle for too long will be decreased until sufficient demand for the resource is generated. Finally, a given service provider should generate sufficient demand or risk "bankruptcy", meaning that the service provider is removed from the allocation directory. Accordingly, supply and demand are the main driving forces responsible for lowering or increasing levied prices. Profits or losses determine the continued existence of a given service provider or its removal from the service provider allocation directory.

Pursuant to a further embodiment of the invention, strategic load balancing rules are applied to each service provider to dynamically de-install an ineffective service provider, and to dynamically replicate service providers that cannot handle all of the current demand from service requestors. These load balancing rules, as well as any rules used to determine levied prices, need only utilize information that is locally available on the computer network. Such rules need not be based upon global knowledge of the state of the entire computer network. In this manner, the levied prices computed by the service broker, in combination with strategic load balancing, produce a globally adaptive, self-configurable behavior for a plurality of service providers.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a hardware block diagram showing an illustrative operational environment for the present invention.

FIG. 2 is a flowchart setting forth an operational sequence to be performed by service providers.

FIG. 3 is a flowchart setting forth an operational sequence to be performed by the system of FIG. 1 upon issuance of a service request by a service requestor.

1564 Please Scan As Exam. Notes

US005654902A

United States Patent [19]

Scheidt et al.

[11] Patent Number: 5,654,902

[45] Date of Patent: Aug. 5, 1997

[54] **RECYCLABLE COMPONENT WITH DATA STORAGE FOR STORING INFORMATION FOR EXAMINING THE COMPONENT AND PRODUCT INCLUDING SUCH A COMPONENT**

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[73] Assignee: **Sony Deutschland GmbH**, Germany

[21] Appl. No.: **233,762**

[22] Filed: **Apr. 26, 1994**

[30] **Foreign Application Priority Data**

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[51] **Int. Cl.**[6] **G06F 17/00**; G01B 21/00

[52] **U.S. Cl.** **364/551.01**; 364/468.22; 364/468.23; 364/478.03; 364/478.1

[58] **Field of Search** 364/550, 551.01, 364/508, 506, 566, 556, 468.01, 468.12, 468.15, 468.16, 468.17, 478.02, 478.03, 478.07, 478.09, 478.1, 571.01, 571.03, 571.04; 355/203, 202, 204; 264/36, 37; 164/92.1; 396/6; 399/27, 106, 253; 428/903.3

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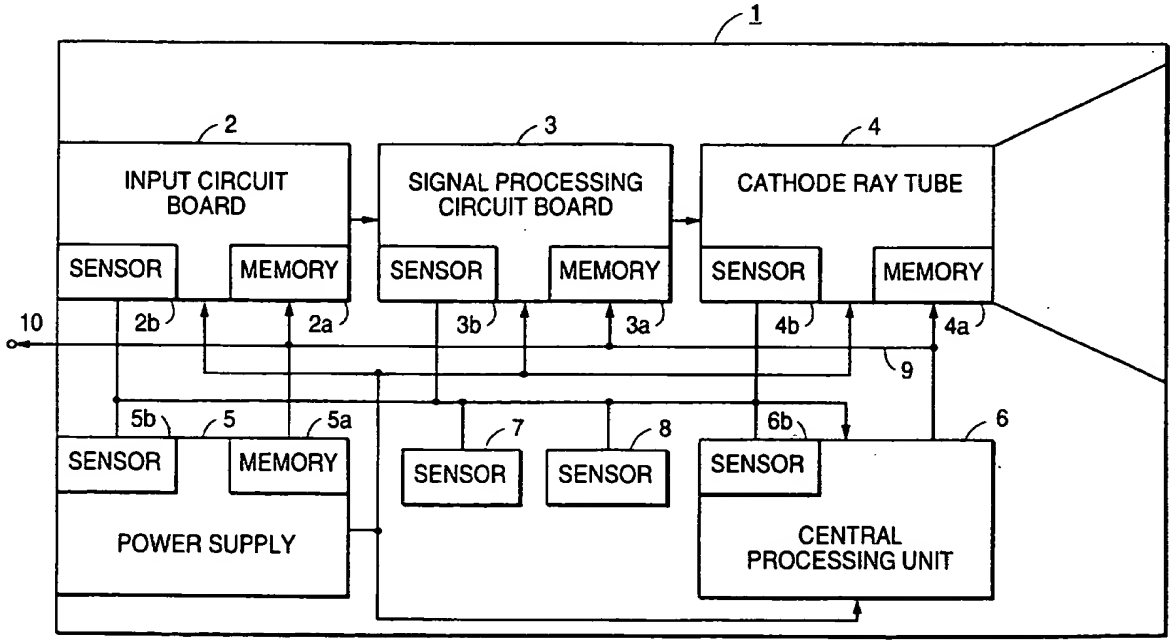
Primary Examiner—James P. Trammell
Assistant Examiner—Edward Pipala
Attorney, Agent, or Firm—Ronald P. Kananen

[57] **ABSTRACT**

The invention relates to the problem of recycling of products of complicated structure and is based on the idea to provide each component of the product with a memory in which not only at the timing of production information such as location of material to be recycled is stored but also additional data, e.g., about repair and/or specific stress to which the component has been exposed during its use. Such additional data may be collected via specific sensors provided either on each component or in or on the body of the product to be memorized in the memory of each component. Based on the idea of the invention, the life history of each component of the discarded product can be checked individually for determining whether such component may be reused or disposed for disassembling and recycling.

17 Claims, 2 Drawing Sheets



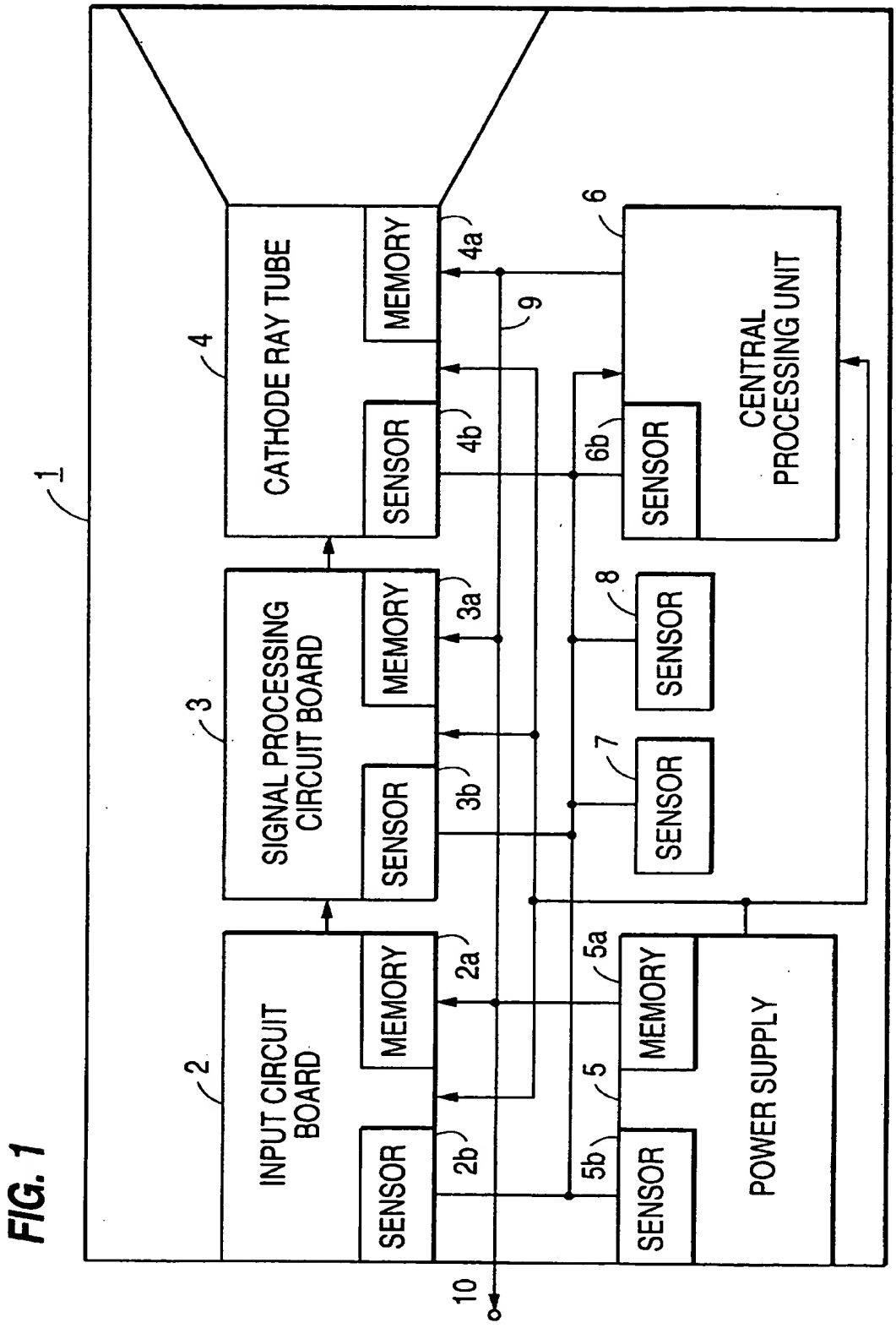
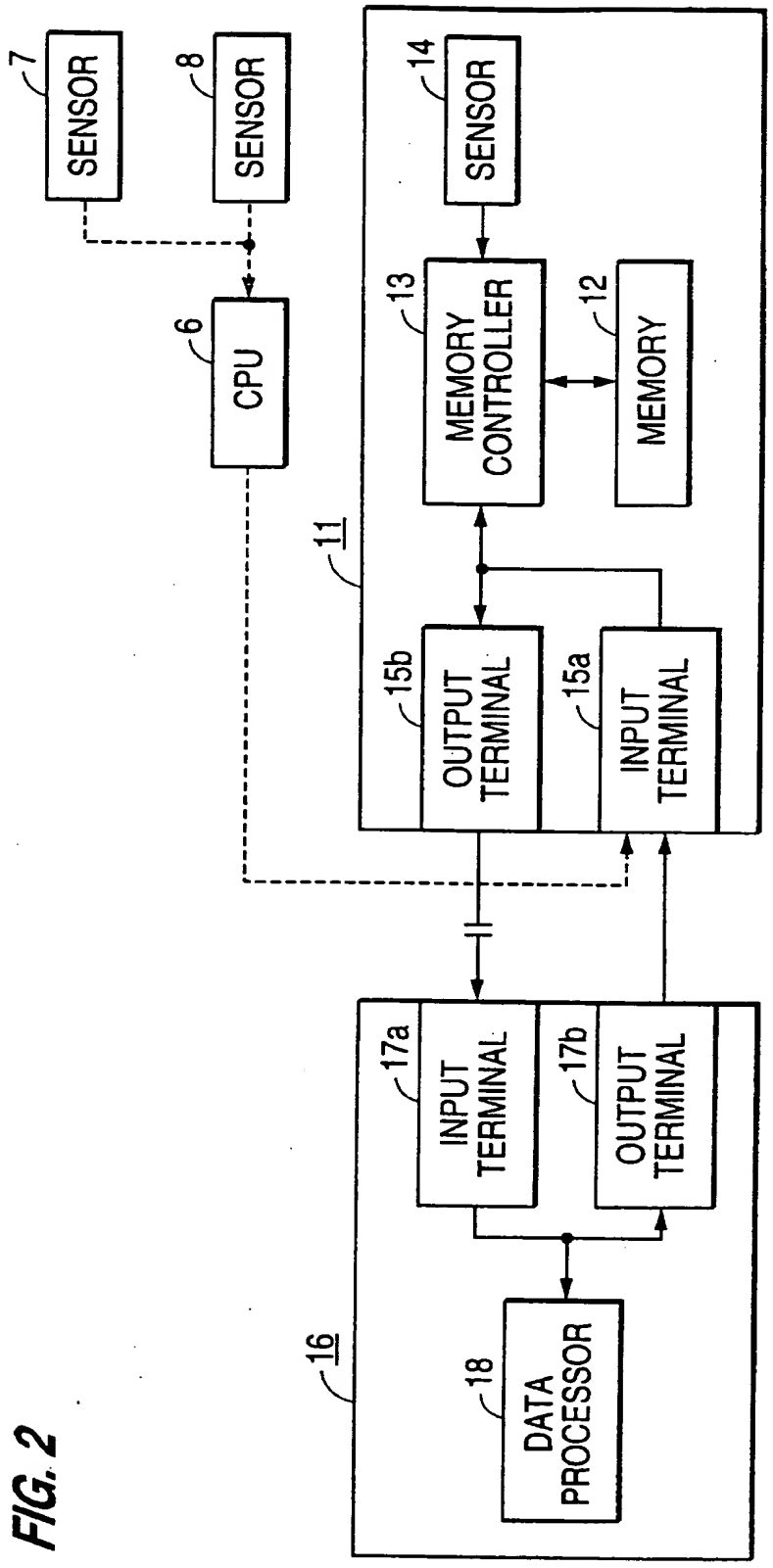

1
2
INPUT CIRCUIT BOARD
MEMORY
2a
SENSOR
2b
3
SIGNAL PROCESSING CIRCUIT BOARD
MEMORY
3a
SENSOR
3b
4
CATHODE RAY TUBE
MEMORY
4a
SENSOR
4b
5
MEMORY
5a
SENSOR
5b
6
CENTRAL PROCESSING UNIT
SENSOR
6b
7
SENSOR
8
SENSOR
9
10
POWER SUPPLY

FIG. 1


7
SENSOR
8
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14
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6
CPU
13
MEMORY CONTROLLER
12
MEMORY
11
15b
OUTPUT TERMINAL
15a
INPUT TERMINAL
17a
INPUT TERMINAL
17b
OUTPUT TERMINAL
16
18
DATA PROCESSOR

FIG. 2

RECYCLABLE COMPONENT WITH DATA STORAGE FOR STORING INFORMATION FOR EXAMINING THE COMPONENT AND PRODUCT INCLUDING SUCH A COMPONENT

The invention relates to a recyclable component, a product including such a recyclable component and to a check device for examining such a recyclable component.

There are many different kinds of products made by different manufacturers coming into the market and each such product also contains many different kinds of components. If a product becomes obsolete or is taken out of service, the user wants to abandon the product and usually disposes it in one or another undesirable way. Even if the product itself becomes old or invalid, components contained in the product or a part of each component, however may be reused in another product. Therefore, recently recycling of those components is eagerly discussed under an environmental point of view.

One way to enable recycling of a component easier is to indicate on the surface thereof the kind of material which constitutes the component. For example, if a component such as a hausing of a television receiver or a chassis of automobile is formed of a single plastic or metal material, the component can bear the name of the material or a symbol representing the same. It is, however, very difficult to indicate enough information to recycle the component, if the latter is comprised of many kinds of materials or has a complicated constructional composition.

As a type of recycling of a component, it has also been considered to reuse the component as it is, without breaking it up, i.e., in an appliance of same type or in a similar type of the product in which the component was used before, or as a service spare part. In that case, the indication of the kind of material is insufficient and it is more important to know how long the component has already been used or whether the component can still be reused for long enough a period in the future. Such information is very important, especially for electrical components or mechanical components having a movable part. Such transitional information can not be indicated properly on the surface of a component.

Meanwhile, it is known, for example by Canadian Patent 1,272,808, to include a memory in the product for storing information data as to production and repair or maintenance service of the product. Such information, however, is useless for recycling, because some components taken from the product are transferred to a recycling process instead of the product itself. Furthermore, if the product has not been repaired in spite of that the component has been impaired or damaged, such information is incomplete and not reliable.

According to U.S. Pat. No. 4,586,147, a product may be further provided with a sensor detecting failure information of the product during its use. The failure information and the history information as to the failures which is stored in a memory provided in the product can be used for maintenance. However, because such failure information and history information will remain only in the main body of the product when the consumed product is forwarded to recycling, it is impossible to know any defect caused in each or at least in the essential components of the product.

It is also known, for example, from UK Patent Publication GB 2116748 A, that each circuit board comprising a plurality of components may include a memory for storing information as to assembly or testing which is necessary during production. In the course of testing, if any faulty component mounted on the circuit board is found, the identity of the faulty component is written into the memory and any necessary remedial action will be taken as part of the production. Therefore, only circuit boards including no faulty components can be used for completing the product. However, there is no way to identify any defect of the circuit board occurring during the use of the product, which, however, is a most important information for recycling.

UK Patent Publication GB 2142172 A also discloses that each assembly or subassembly constituting a product has a memory for storing elapsed time and maintenance information such as the time of the last overhaul. However, such information is not sufficient for recycling the assembly or sub-assembly.

After all, in the above described prior art, it is very difficult to examine discarded products properly before forwarding to recycling of each component and easily evaluate each component which has been taken from the discarded products and which may have defects caused during its use.

According to the invention, this problem is solved by providing each component constituting a product with a memory for storing information data useful for recycling.

One way of carrying out the invention is described in detail below with reference to drawings which illustrate a specific embodiment, in which:

FIG. 1 is a schematic block diagram showing a television receiver as an embodiment according to the invention; and

FIG. 2 is a schematic block diagram showing an example of component according to the invention including a check system for checking the condition of the component.

Referring to FIG. 1, a television receiver 1 has normally an input circuit board 2 including an antenna input terminal, a tuner and auxiliary input terminals, a signal processing circuit board 3, a cathode ray tube 4, a power supply 5 and a central processing unit (hereinafter CPU) 6 as its main components. It will be omitted to explain the well known function and operation of each component and the television receiver 1, which are irrelevant to the invention.

The voltage source is supplied from the power supply 5 to respective components 2, 3, 4 and 6. Control signals from the CPU 6 are supplied to respective components 2, 3, 4 and 5 so as to control the same during operation of the television receiver 1.

According to the invention, each component 2, 3, 4, or 5, which or a part of is aimed to be recycled, has a memory unit 2*a*, 3*a*, 4*a* or 5*a* (an internal memory installed in the CPU 6 may be used as a memory unit for the CPU 6) which store information data necessary for the evaluation of the component before forwarding to recycling. Such information data can be classified into two types; active data and passive data.

Active data may include, for example, information as to stress to which the component has been exposed during use, i.e., a) maximum/minimum temperature; b) maximum acceleration (in case the component has been dropped or shocked); c) minimum power consumption; d) maximum voltage; e) maximum humidity exposure; f) function caused by the component; g) short circuit occurred in relation to the component; h) operation hours of the component; i) outgassing; j) emissions; k) electromagnetic radiation: each exceeding a given tolerance and long and how often, but not limited to those.

Such information classified into active data is detected by one or more physical (mechanical) or chemical sensor 2*b*, 3*b*, 4*b*, 5*b*, 6*b*, 7 or 8 provided within the television receiver 1 or directly in or on each component 2, 3, 4, 5 or 6 and stored selectively into each memory 2*a*, 3*a*, 4*a* or 5*a*. Each

component 2, 3, 4 or 5 may require different information to be evaluated according to the nature of the component, therefore, different sensors may be used. Some sensor, however can be commonly used for different kinds of components.

The television receiver 1 may have a separate memory unit (though not illustrated) for storing information data commonly related to several components or information data related to the television receiver 1 as a whole, such as construction of the television receiver 1, the locations of the components or instruction of disassembly. Such information may be very useful for automatic or even manual disassembly. Such separate memory unit may be replaced with the memory of the CPU 6. All or some of the memory unit might be also connected through a data bus 9 to a diagnostic connector 10 provided to the external of the television receiver 1, which enables data retrieving without opening the housing.

If the television receiver 1 is (connected to the main power source regardless whether the television receiver 1 is actively used or operated in the stand-by mode, the central processing unit 6 is always operative so that the detected signal from each sensor 2*b*, 3*b*, 4*b*, 5*b*, 6*b*, 7 or 8 can be processed, and the above described stress data is stored or renewed in each memory unit 2*a*, 3*a*, 4*a* or 5*a*, or in the internal memory of the CPU 6. In case that each sensor is a self-hold type which can maintain the condition detected last, even if the television receiver 1 has been disconnected from the main power source, the CPU 6 can store and release the last detected condition from each sensor 2*b*, 3*b*, 4*b*, 5*b*, 6*b*, 7 or 8 as long as the television receiver 1 is connected to the main power source. If the television receiver 1 is a battery operated type or installed with a back-up battery, there is also no problem.

In addition to the above active data, each memory unit 2*a*, 3*a*, 4*a* or 5*a* of each component 2, 3, 4.., 5 or 6 must or may further stores passive or supplementary information data. Passive data may include, for instance, manufacturing data of the component which has been set in the factory. Supplementary (active or passive) data may include, for instance, distribution and sales data of the component which has been set during distribution and assembly of the finished product; history of repair and maintenance service data which has been set during repair and maintenance service; data of technical conditions for product guarantee in order to protect against unjustified guarantee claims. These memory units might be used for secondary purposes. If a power management unit is built into the product in order to reduce energy consumption during normal usage of the product, relevant data can be stored in a memory unit.

The manufacturing data of the component may includes manufacturer information such as trademark or name of producer, model name or number, individual product number or serial number, manufacturing date and place, specifications, composing materials—the sorts of applied plastics and additives, locations of built-in hazardous materials, official life of the component, manufacturing history, testing information, fault reporting information. The information regarding manufacturer might be used to classify products or components collected for recycling according to the manufacturer. This is useful, for example, in deciding the interchangeability of certain components in the field of services. The information regarding specifications or locations of the applied materials will help recycles in the removal of hazardous materials or, the recovery of precious metals and sorting of plastic fractions.

The distribution and sales data of the component may includes wholesaler and retailer's name, purchase date, sales date, purchase price, selling price, destination. If the ownership of the component is changed on recycling, such information on the ownership can be stored or modified by recycles. The history of repair and maintenance service data may includes replacement information of the component, parts repair and adjustments of only part of the component.

The above described active, passive and supplementary information data can be stored in a certain format, preferably in a common format regardless of type of components. More preferably, the information data are categorized according to the nature of the information as described above and stored selectively in designated memory areas or stored as block data together with data identifying the categories. As all or sane of passive data is not required to be modified, even service personnel, vendors and recycles have no possibility to input or rewrite all or some of passive data into the memory units. Active data is relatively important to evaluate the component to be recycled and to assess the commercial value thereof. To prevent data manipulation, the stored data are selectively tamper-proof by means of appropriate memory media and recording mechanisms for example encryption as occasion demands. Therefore, only authorized personnel can modify some active data, passive data and supplementary data with special devices, if necessary. For example, the official life time set by the first manufacturer of the component may be replaced with an official life time estimated by the supplier of the recycled component on the basis of the residual life time and the quality check result. Therefore, an appropriate type of memory such as PROM, EPROM or EEPROM may be selected for each memory unit according to the function thereof to be required and the category of information data to be stored thereinto.

Referring to FIG. 2, more detail construction of each component is explained. The component 11 has, besides its own functional elements, the memory unit including a memory 12, a memory controller (or interface) 13 and a sensor 14 as an option. The memory 12 is preferably a non-volatile memory as the component will be examined even after being taken out from the product. The memory unit might be a dual-port type, one port for recording active data, one port for retrieving active and passive data. In that case, the memory unit has an input terminal 15*a* and an output terminal 15*b*. These terminal may be combined in a single input/output terminal.

The stress information detected by the sensor 7 or 8 provided within the television receiver 1 as shown in FIG. 1 or by the sensor 14 provided to the component 11 is supplied to the CPU 6 provided within the television receiver 1 as shown in FIG. 1, if the detected stress information is required to be processed so as to form a proper data signal. The processed data signal derived from the CPU 6 is written into the memory 12 through the input terminal 15*a* and the memory controller 13.

The stress information detected by the sensor 7, 8 or 14 is supplied through the terminal 15*a* or other terminal or the memory controller 13 to the memory if the detected stress information is not required to be processed. Other active data, passive data and supplementary data can be also stored in a similar manner to the above.

As a sophisticated embodiment, the component 11 or the memory unit may include a micro-processor with a memory instead of the memory controller 13, which can replace the CPU 6 in connection with the invention. Even each component 11 may have an own battery.

When the television receiver 1 becomes outdated or should be taken out of service and is forwarded to recycling, the information data stored in the memory units can be used

to manage the distribution, disassembly and disposal process. From each of discarded and then collected television receivers, the information stored in the memory units are read out through the diagnostic connector **10** to check quality of each component with a check device **16** and assist in deciding which components still have a relatively high residual value. Television receivers containing component of higher residual value are then sent to automatic or manual disassembly line for recovery of valued components, possibly according to the information of the location of the valued component and instruction data of disassembly.

The disassembled components are sorted into same kind or type according to the passive information. Such sorted components are subjected to dedicated quality checks in more detail and classified according to the stress information into a specified tolerance field allowing a defined future use. Components qualified or certified for reuse are subsequently refurbished if requested and forwarded to manufacturers using the qualified or certified components. Similarly, the components with a high content of pure plastics or precious materials are sent to dedicated recovery lines. Particularly, hazardous materials can be removed safely and with certainty, since detailed information about the materials and their locations in the components is also available in the memory units.

The check device **16** has an input terminal **17***a*, a data processor **18** and, if necessary, an output terminal **17***b* which may be combined with the input terminal **17***a*. The component **11** is connected to the check device **16** through the output terminal **15***b* of the former and the input terminal **17***a* of the latter, through the diagnostic connector **10** before disassembly or directly after disassembly. The data processor **18** of the check device **16** reads out the information data stored in the memory **12** through memory controller **13** and the output terminal **15***a*. The data processor **18** of the check device **16** may output information data to be stored in the memory **12** through the input terminal **15***a* and the memory controller **13**.

The connection of the component **11** and the check device **16** can be achieved by means of wireless data transmission to allow easy automation of the check procedure. In that case, the component **11** and the check device **16** are provided with wireless transmitters and receivers, respectively, instead of the output terminals **15***b* and **17***b* and the input terminals **15***a* and **17***a*, respectively.

Although memory units are solely used for storing information data, bar code or printed markings can be used also for storing relatively simple static information data in combination with the memory units.

The application of the invention is not limited to electric or electronics components but also applicable to mechanical components or any other components, if such a component can be provided with a memory. Component blocks, modules, assembles or sub-assembles also can be called generally as components in the sense of this invention.

The products which Utilize components according to the invention are also not limited to television receivers but can be also any electric, electronics or mechanical products.

We claim:

1. A recyclable product comprising:

a) one or more component blocks;

b) sensor means associated with said one or more component blocks, said sensor means detecting a condition of one or more of the associated component blocks and providing a detection signal representative thereof;

c) memory means included with at least one of said one or more component blocks; and

d) control means for receiving said detection signal from said sensor means, processing the detection signal, and providing said memory means with the processed detection signal;

wherein said sensor means detects stress of said component block during use and derives the detection signal so as to include stress information that is indicative thereof;

wherein said memory means stores said stress information and also stores passive data necessary for recycling said one or more component blocks; and

wherein at least one of said one or more component blocks includes output terminal means for release of information data including the stress information and the passive data stored in said memory means, said stress information including active data indicative of at least one of the following conditions detected by the sensor means: (a) maximum/minimum temperature; (b) maximum acceleration; (c) maximum power consumption; (d) maximum voltage; (e) maximum humidity exposure; (f) malfunction caused by the component; (g) short circuit occurred in relation to the component; (h) outgassing; (i) emissions; and (j) electromagnetic radiation;

whereby each said one or more component blocks are recyclable on the basis of the passive data and the active data provided from the output terminal means.

2. A recyclable product according to claim **1**, wherein said product includes a plurality of said component blocks each including at least one sensor.

3. A recyclable product according to either one of claim **1** or **2**, wherein at least one of said one or more component blocks further includes input terminal means for receiving the processed detection signal from said control means.

4. A recyclable product according to claim **1**, wherein the passive data includes the location within the product of said one or more components.

5. A recyclable product according to claim **1**, wherein the passive data includes the location of hazardous or precious material.

6. A recyclable product according to claim **1**, wherein the memory means are tamper-proof.

7. A method of recycling a product that includes at least one component, said method comprising the steps of:

a) reading out from memory means provided within the product and associated with said at least one component information data related to said at least one component, said information data including active data describing stress that said at least one component has undergone and passive data indicating at least one of: the location of the component, and instructions for disassembly of the product;

b) disassembling the product to separate the at least one component according to the passive data;

c) sorting the at least one component according to the active data; and

d) forwarding the at least one component for subsequent use thereof.

8. A method according to claim **7**, wherein said active data is descriptive of at least one of the following conditions experienced by the component: maximum/minimum temperature; maximum acceleration; maximum power consumption; maximum voltage; maximum humidity exposure; malfunction; short circuit; outgassing; emissions; and electromagnetic radiation.

9. A method according to claim **7**, wherein said passive data includes manufacturing data that includes at least one of